

ACCESSION #: 9606180224

LICENSEE EVENT REPORT (LER)

FACILITY NAME: LaSalle County Station Unit One PAGE: 1 OF 4

DOCKET NUMBER: 05000373

TITLE: Unit One Manual Scram Due to High Vibration on Main

Turbine Generator Exciter

EVENT DATE: 05/12/96 LER #: 96-006-00 REPORT DATE: 06/11/96

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 68

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Steven C. Kleinhardt, System Engineer TELEPHONE: (815) 357-6761

Extension 2245

COMPONENT FAILURE DESCRIPTION:

CAUSE: B SYSTEM: TL COMPONENT: Oil MANUFACTURER: GE

REPORTABLE NPRDS: Yes

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 0107 hours on May 12, 1996, Unit 1 was operating at a steady state power level of 88% when vibration levels on the main turbine-generator alternator exciter bearings increased. Operator actions in correcting the vibrations were unsuccessful and the reactor was manually scrammed. The high vibrations occurred when oil deflectors for the vibration probe assemblies installed at each exciter bearing rubbed the rotor shaft. The oil deflectors were determined to have an insufficient bore to maintain clearance with the rotating shaft to prevent rubbing.

During the event and subsequent reactor scram, all safety systems performed as designed. The operators initiated conservative actions which shut down the turbine-generator prior to vibration levels exceeding the operating range. The safety significance of this event was minimal and posed no threat to the health and safety of the public.

The root cause of this event was that the vendor did not use the correct drawing and manufactured the deflectors with the wrong inner diameter.

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## PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

### A. CONDITION PRIOR TO EVENT

Unit(s): 1 Event Date: 05/12/96 Event Time: 0107 Hours

Reactor Mode(s): 1 Mode(s) Name: Run Power Level(s): 88%

### B. DESCRIPTION OF EVENT

At 0107 hours on May 12, 1996, the Unit 1 reactor was manually scrammed when vibration levels on the main turbine-generator alternator exciter (TG) [TL] bearings increased and operator actions in correcting the vibration were unsuccessful. Unit 1 had been operating at a steady state power level of 88% when control room vibration monitors for the two exciter bearings started to indicate an unexpected increase. Shift operators notified engineering personnel and performed an inspection of the exciter. Although the operators found normal lubricating oil flow and oil temperature at

the bearings, vibration was apparent at the exciter assembly. All other turbine-generator bearing vibrations were normal. Vibration on one of the exciter bearings soon reached the alarm setpoint of 7 mils and the operators started reducing turbine and reactor power levels in an effort to lower vibration. Bearing vibration increased further and when the vibration level reached 9 mils, the operators took action to manually scram the reactor.

After the scram, reactor vessel water level initially decreased to minus(-) 7 inches due to normal level shrink. The operators entered procedure LGA-01, Reactor Level Control, and restored level using the 1C Motor Driven Feedwater Pump (MDRFP, FW) [SJ]. All safety systems functioned as expected and reactor shutdown and cooldown proceeded satisfactorily.

This event is reportable per 10CFR50.73(a)(2)(iv) due to a manual actuation of an engineered safety feature.

### C. CAUSE OF EVENT

The high vibrations occurred when the oil deflectors for the vibration probe assemblies (TS)[IV] installed at each exciter bearing rubbed the rotor shaft. During inspection of these assemblies, hot spots were apparent on the shaft at both the outboard and inboard bearings. The investigation determined that as turbine-generator load increased, rubbing started and created enough local heating to cause a bow to develop in the shaft. This bow

eventually resulted in the high vibrations sensed at the two exciter bearings. The oil deflectors were determined to have an insufficient bore to maintain clearance with the rotating shaft to prevent rubbing.

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Improved vibration monitoring assemblies were installed on Unit 1 in the recent refueling outage as part of modification, MO1-1-89-003.

This modification provided upgraded turbine supervisory instrumentation (TS) [JJ], including revised vibration detection probes for all bearings. The outer oil deflectors were included in the vibration probe assemblies installed at the exciter bearings.

The inner oil deflectors were also replaced during the refueling outage when routine maintenance inspection revealed these deflectors to be out of tolerance. These deflectors were purchased as new but did not conform to the correct tolerance criteria. The clearance was insufficient because the manufacturing drawing was not used to determine the proper inner diameter of the new textolite deflectors.

The inner diameter was manufactured to standard clearances for aluminum deflectors based on clearance per inch of shaft diameter and, as a result, the deflectors were manufactured and installed with insufficient clearances.

The exciter was thoroughly inspected to determine whether other failures could have caused or contributed to the bearing vibration.

These inspections included verification of the electrical integrity of the stator winding insulation, disassembly and inspection of the exciter bearings and shaft coupling, and verification of exciter alignment. These inspection results were satisfactory verifying that the deflector rubbing caused the vibration and that the exciter incurred no damage as a result.

#### D. ASSESSMENT OF SAFETY CONSEQUENCES

During the event and subsequent reactor scram, all safety systems performed as designed. The operators initiated conservative actions which shut down the turbine-generator prior to vibration levels exceeding the operating range. The maximum vibration occurred immediately after the reactor scram and was recorded at 11.5 mils for the outboard exciter bearing. Although the exciter bearings do not provide automatic turbine trip on high vibration, vibration trip setpoints for all turbine-generator bearings are set at 12 mils.

The safety significance of this event was minimal and posed no threat to the health and safety of the public.

#### E. CORRECTIVE ACTIONS

1. The oil deflectors were re-bored to obtain the proper clearance with the exciter shaft and reinstalled.
2. Vibration levels were monitored during the turbine startup and subsequent increase in power and were satisfactory.
3. The vendor drawing specifying oil deflector clearances has been

corrected and will be incorporated into the modification package for the Unit 2 turbine-generator vibration detectors scheduled for the next refueling outage.

#### F. PREVIOUS OCCURRENCES

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LER NUMBER TITLE

None

#### G. COMPONENT FAILURE DATA

Manufacturer: General Electric

Nomenclature: Textolite Oil Deflector

EPN: None

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Commonwealth Edison Company

LaSalle Generating Station

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ComEd

June 11, 1996

United States Nuclear Regulatory Commission

Attention: Document Control Desk

Washington, D.C. 20555

Licensee Event Report #96-006-00, Docket #050-373 is being submitted to

your office in accordance with 10 CFR 50.73(a)(2)(iv).

Respectfully,

D. J. Ray

Station Manager

LaSalle County Station

Enclosure

cc: H. J. Miller, NRC Region III Administrator

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C. H. Mathews, IDNS Resident Inspector - LaSalle

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